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USDA FOREST SERVICE RESEARCH NOTE

PNW-275 August 1976

SEX IDENTIFICATION OF ADULTS AND PUPAE OF A BIRCH DEFOLIATOR, *RHEUMAPTERA HASTATA*, IN INTERIOR ALASKA

by

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ABSTRACT

A method is described for determining the sex of adults and pupae of *Rheumaptera hastata* (L.) based on external sexual characteristics such as shape of abdomen and location of genital openings.

KEYWORDS: *Rheumaptera hastata*, reproductive organs (insect), birch, Alaska.

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Populations of the spear-marked black moth, *Rheumaptera hastata* (L.) have reached epidemic levels in birch forests of interior Alaska in 1974 and 1975. Investigation of the life cycle and reproductive behavior could not be accomplished accurately without some method of differentiating the sexes. This paper describes a method for identifying sex in both pupae and adults. Similar methods of sex determination were reported by Yates (1969), Jennings and Acciavatti (1975), and Butt and Cantu (1962) for other lepidopterous pupae.

Pupal sexual characteristics can be distinguished only under a microscope (25X) and are confined to the terminal abdominal segments. The primary difference between the sexes is the location of the genital opening. In male pupae, the genital opening is located ventrally on the 9th abdominal segment (fig. 1A) 0.21 ± 0.02 mm anterior to the anal opening located on the 10th abdominal segment. The female genital opening is located on the 8th abdominal segment (fig. 1B) 0.51 ± 0.05 mm anterior to the anal opening also located on the 10th abdominal segment.

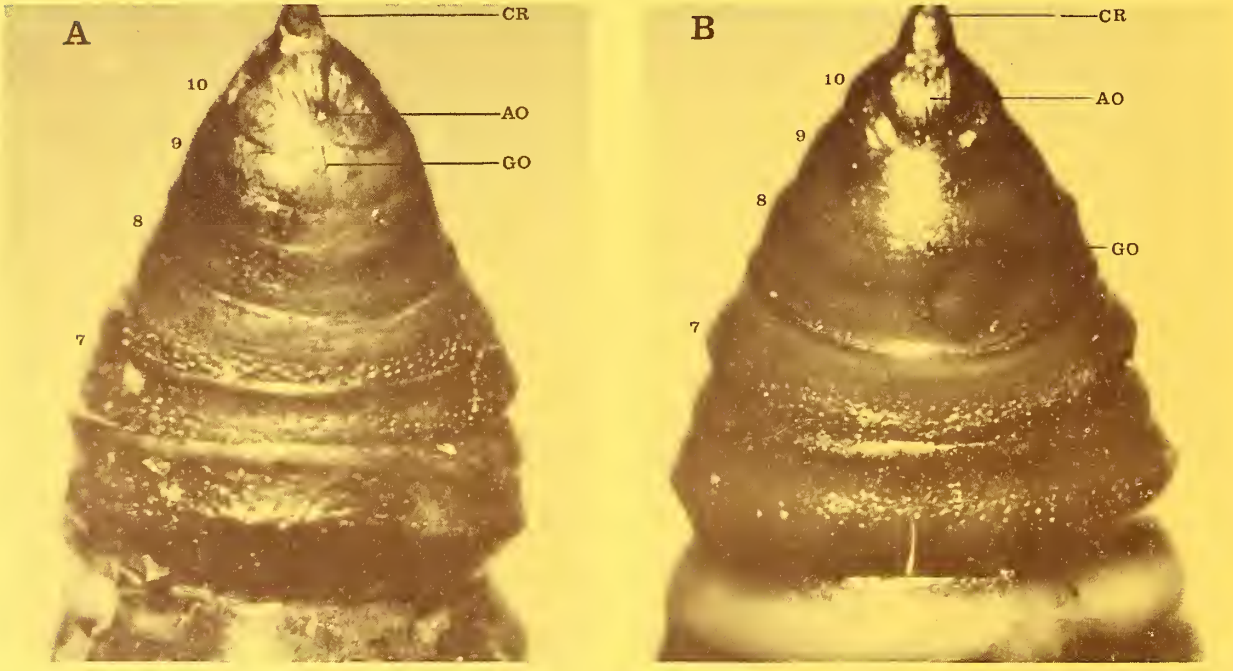

Figure 1.--Ventral abdominal view of (A) *male and* (B) *female pupae of* R. hastata *showing GO, genital opening; AO, anal opening; CR, cremaster; and abdominal segments 6-10.*

Sexual characteristics of adults are discernible without magnification, and field identification can be made readily by examining the terminal abdominal segments. In males, the last visible terminal abdominal segment is the eighth, which appears elongated and is bisected in a dorsal-ventral plane (fig. 2A). This segment encloses the 9th and 10th genital segments. The 7th abdominal segment is the last visible segment in female adults and encloses the 8th, 9th, and 10th genital segments. The valvulae of the ovipositor can often be seen extruding from the 7th abdominal segment (fig. 2B). Slight pressure with the fingers on the last visible abdominal segments of both sexes will reveal the normally retracted genital segments.

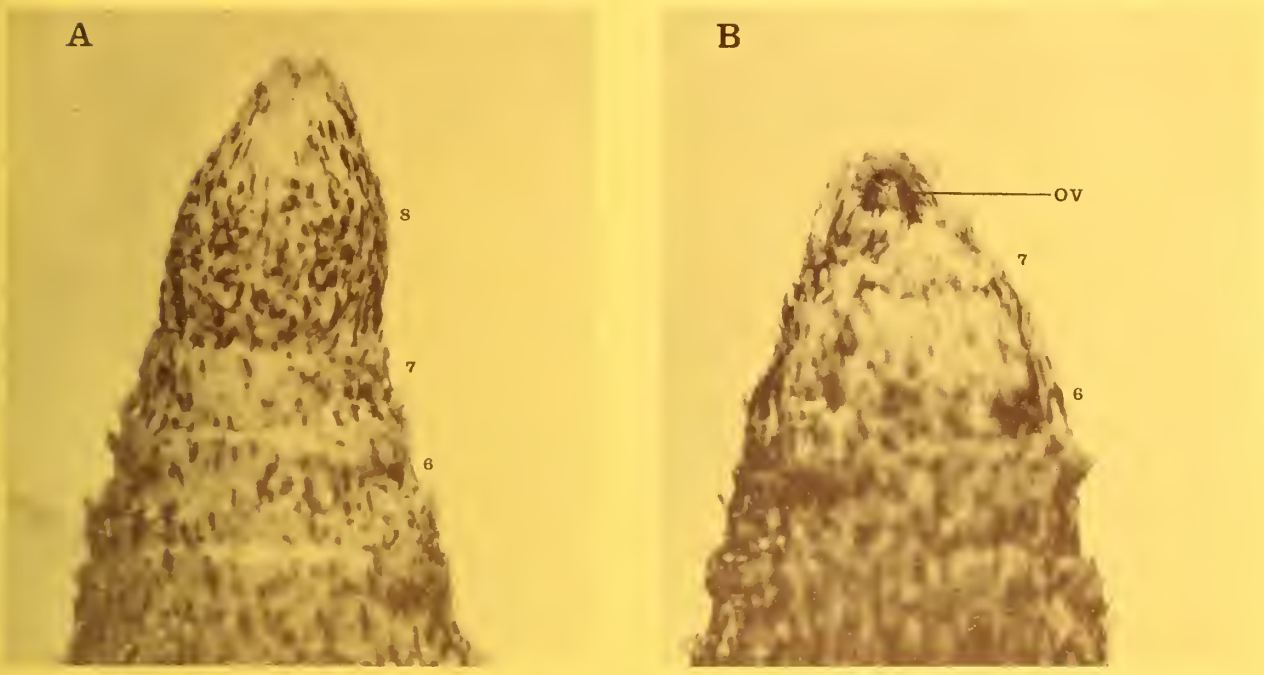

Figure 2.--Dorsal abdominal view of (A) *male and* (B) *female adults of* R. hastata *showing abdominal segments 7-10 and the OV, ovipositor of the female.*

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GPO 996-953